

LIVE LINK

SMS Controller 2x2

User Manual

*2 Digital Inputs
2 Open-Collector Outputs*

*Monitoring
Control
Event Logging
SMS and Email Alarming
Remote Configuration*



advanced information networks

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IMPORTANT INFORMATION

It is important that you read this manual thoroughly before using your Live-Link SMS Controller.

Record the following Information as you will need it when updating your unit or making support inquiries:

RECORD YOUR PRODUCT AND CLIENT AREA DETAILS HERE

Live-Link Phone Number: _____

Live-Link IMEI Number: _____

Client Area Web Address: www.advancedinformation.net/xe7000/

Client Area Login Username: _____

Client Area Login Password: _____

SMS Command Quick Reference:

?	Get System Status	(see section 8.3).
STATUS	Get System Status	(see section 8.3).
1 ON	Turn on Output 1	(see section 4.3).
1 OFF	Turn off Output 1	(see section 4.3).
2 ON	Turn on Output 2	(see section 4.3).
2 OFF	Turn off Output 2	(see section 4.3).
RESET	Reset the device.	(see section 8.4).

Complete this business card sized reference card, photocopy it and give it to your team so they can each carry a copy in their wallet.

Live-Link SMS Controller Quick Reference Card

Site: _____ Ph No: _____

SMS Commands:

?	Get System Status
1 ON	Turn Output 1 On
1 OFF	Turn Output 1 Off
2 ON	Turn Output 2 On
2 OFF	Turn Output 2 Off
RESET	Reset the Device



www.advancedinformation.net/live-link/

Contact your local distributor for all support inquiries:

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1 OVERVIEW

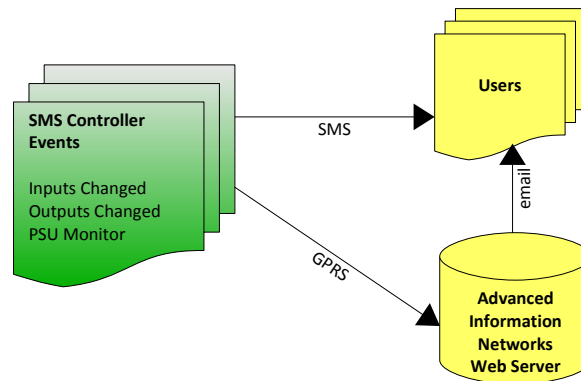
The Live-Link SMS Controller is a versatile monitoring and control device that can be used in a wide range of applications. It is remotely configured over from a central web site, which also provides a watchdog service to ensure that each device make regular contact.

1.1.1 Specifications

- **Power Supply:** 9-42 V DC.
- **Current Consumption:** 40mA at 12V Idle.
- **Digital Inputs:** 2x Digital Inputs with Internal Pullups.
- **Outputs:** 2x Open-Collector Outputs. Rated to 42V / 300mA.
- **Wireless Connectivity:** GPRS / GSM.
- **Cellular Antenna Connector:** SMA.
- **EMC Compliance:** AS/NZS CISPIR22: 2002 Class B and FCC 47 Part 15: 2001 Class B.
- **Temperature Range:** TBD.
- **Weight:** TBD.
- **Size:** 109.79 x 90.79 x 37.20mm

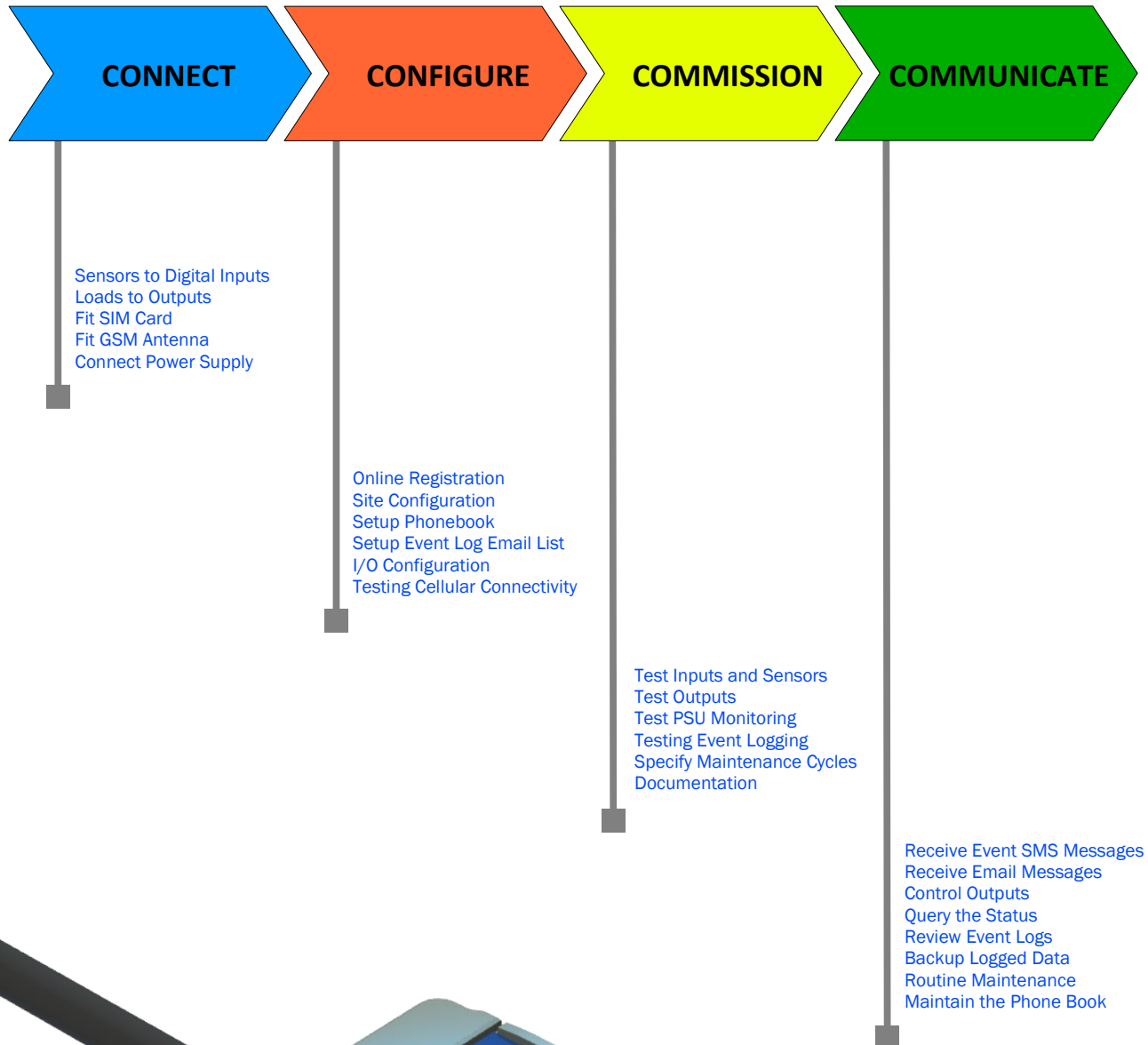
1.1.2 Understanding Information Flow

The following diagram provides a simplified overview of the information flow within the Live-Link SMS Controller System:

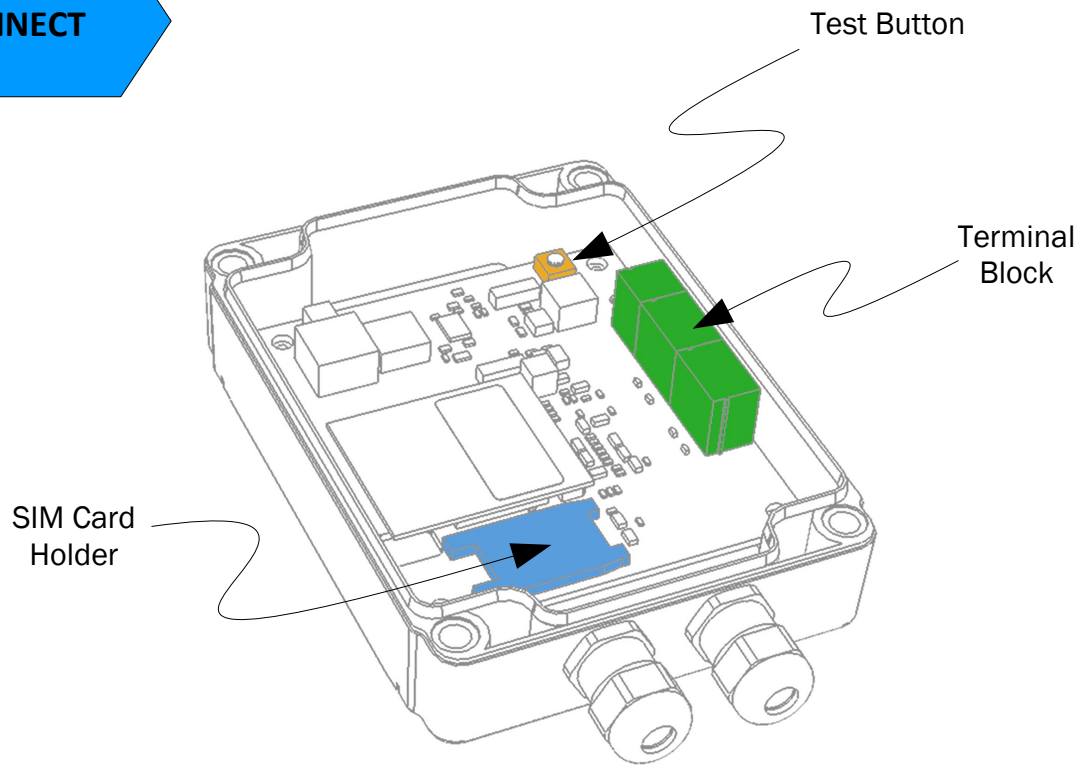


Information Flow within the Live-Link SMS Controller System

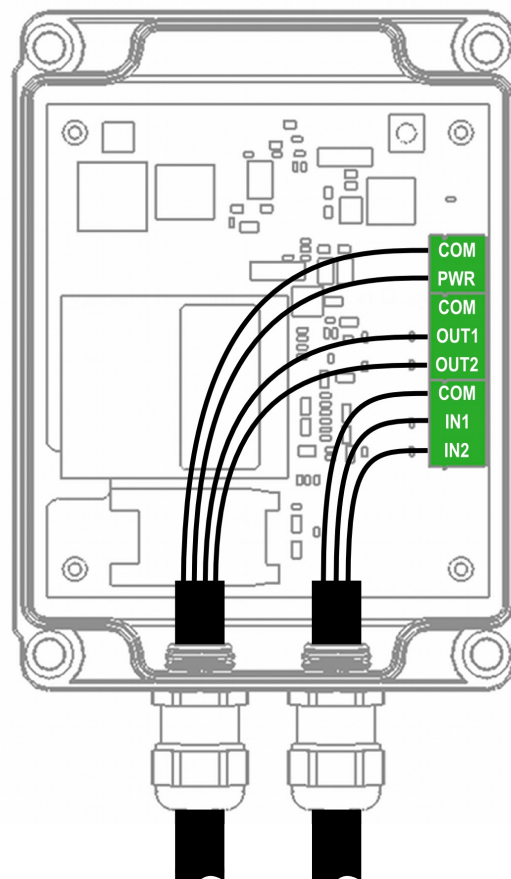
2 GETTING STARTED



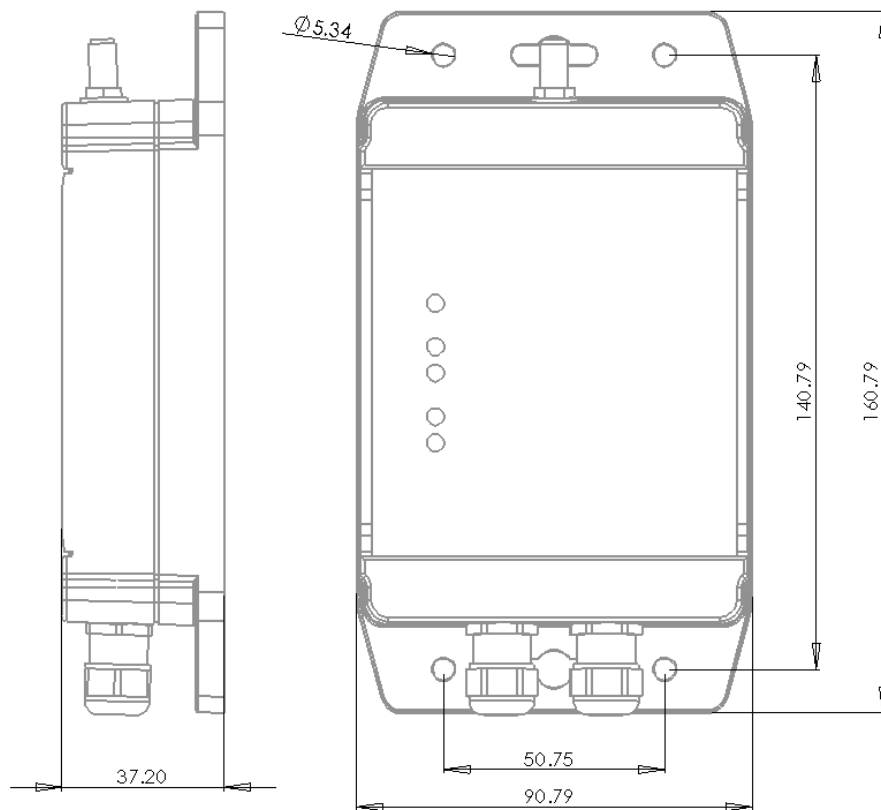
CONNECT



Location of key parts inside the SMS Controller



Example Cabling



Mechanical Drawing (mm)

See Section 3.1 for Connecting Inputs.

See Section 4.1 for Connecting Outputs.

See Section 6.2 for Antenna Connection.

CONFIGURE

Each Live-Link SMS Controller is configured in the client area of the Advanced Information Networks web site. Therefore the first stage of configuration is to setup your user account, and then to add the SMS Controller to that account.

Online Registration

Contact Advanced Information Networks for your username and password.

[See Section 7.1](#)

Then you can login to the client area of the Advanced Information Networks web site:

<http://www.advancedinformation.net/xs7000/>

Once inside the client area, you will see the **Dashboard** which lists all your devices.

Go to the **Add Unit** page to add your SMS Controller to your account so that you can configure it.

The web server uses the IMEI number to identify each device.

Site Configuration

Units that have been added to your account can be configured on the **Edit Details** page.

[See Section 7.1](#)

Setup Phonebook

Only predefined users can receive alarm messages from the SMS Controller and control its outputs. These users are stored in the phone book of the SMS Controller, which is maintained online. You will need to add name, cell phone number, and email address of each user.

[See Section 7.1](#)

The phone book can be found on the **Edit Details** page.

Setup Event Log Email List

Events can be sent to a number of email addresses.

[See Section 7.1](#)

The email list can be found on the **Edit Details** page.

I/O Configuration

Various settings for the inputs and outputs can be configured on the **Edit Details** page.

[See Sections 3.4 and 4.5](#)

Testing Cellular Connectivity

A SIM Card that is known to be working should be fitted to the SMS Controller. Press the button until the details of the cellular connection are shown on the display.

[See Section 6.1](#)

COMMISSION

Now that the SMS Controller has been configured it must be tested and documented before it is put into active service.

Test Inputs and Sensors	The LEDs on the front panel of the SMS Controller show the status of each input. Note that they will flash during the debounce time while it waits for the input to settle in a new state.	See Section 3.2
Test Outputs	Send SMS commands to the SMS Controller to turn the outputs on and off.	See Section 4.3
Test Power Supply Monitoring	Adjust the power supply voltage to check the low power alarm. (You may have to do this test on the bench, rather than in the field.)	See Section 5.2
Test Event Logging	Check that you have received the following: • Correct text messages • Correct logs on the web server (see the Event History page) • Correct emails	See Section 7.2
Specify Maintenance Cycles	It is the users responsibility to specify and carry out maintenance and calibration cycles that are appropriate for their specific equipment and application.	
Documentation	It is good practice to document the system, the organisations, and personnel involved with each site that is commissioned.	

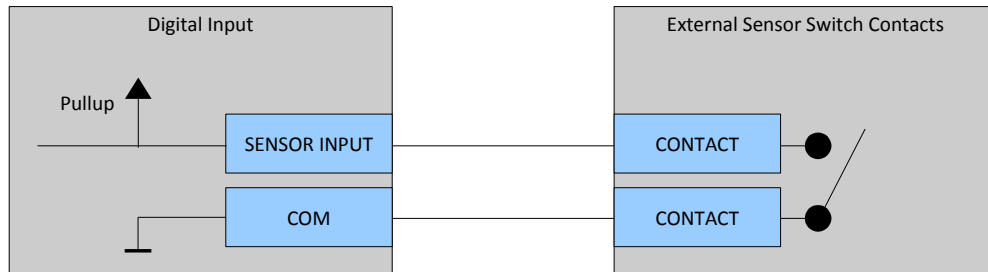


Once in active service the system will have the following activities:

Receive Alarm Messages	Users will receive alarm messages when: The device is reset, An Input Changes, An Output is Changed, Power gets low, or returns to a safe level. Alarms are only sent once and do not need to be acknowledged by reply SMS.	See Section 8.1
Control Outputs	Users can turn power to the loads on and off using text messages.	See Section 4.3
Query the Status	A user can request the status of the system by sending it a text message. It will reply with a status text message.	See Section Error: Reference source not found
Review Event Logs	The system administrator should review the logged data at a frequency that is suitable for the application.	See Section 7.2
Backup Logged Data	It is the responsibility of the system administrator to periodically back up data that is logged to the Advanced Information Networks web server.	
Routine Maintenance	During commissioning the system integrator may have specified routine maintenance and calibration procedures that need to be undertaken.	
Maintain the Phone Book	From time to time the users of the system will change. The configuration is easily updated via the Advanced Information Networks client area.	See Section 7.1.3

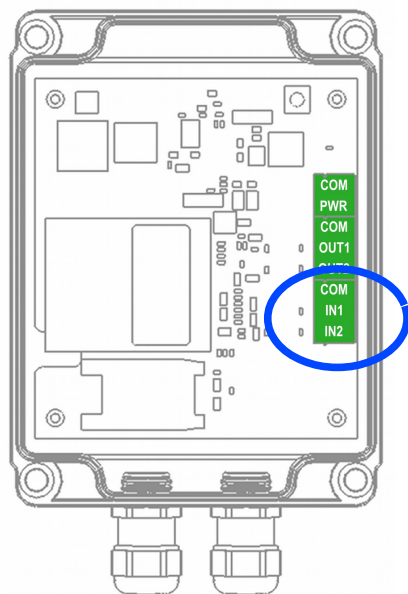
3 INPUTS

The Live-Link SMS Controller features 2 voltage-free, clean-contact sensor inputs that can be connected to security switches, wet floor sensors, tamper switches, door switches etc. The inputs detect when a set of connected contacts are open or closed. Each sensor is connected to an input pin and a COM pin. The COM pins are all connected together. Do not assume that the COM pins are connected to Earth – this depends on your power supply arrangement.



Sensor Connection

3.1 Input Connectors



The input terminals are the lower 3 positions of the main terminal block. They are labeled COM, IN1 and IN2.

3.2 Input LEDs

The red Input LEDs show the state of each of the inputs:

ON	Input is high voltage (or open circuit).
OFF	Input has been connected to COM (closed circuit).
FLASHING	The input has recently changed, and is being debounced, ie: waiting for stability.

3.3 Debounce

When a switch opens or closes, there is usually some bounce or chatter associated with the mechanical movement of contacts. This is known as switch bounce, and applies to mechanical switches, relays, reed switches etc.

Also, sensors in some applications may be measuring things that do not have a smooth transition from one state to another. For example, a level sensor in a water tank that is being filled may chatter on the waves as the level moves up past the sensor position.

To provide stability for both of these scenarios, the Live-Link SMS Controller will not accept an input change event unless the input has been in the new state continuously for a set period of time. This is called the debounce time, and it is fixed at 5 seconds.

When an input changes state, its associated LED will start flashing until the debounce period has filtered any noise and the input has been stable for a set period of time. If the input settles in the original state, no input event is generated. So for example, when a 2 second pulse (closed – open – closed) occurs, the LED will flash until it settles in the closed state for 5 seconds, and no input change will be registered.

3.4 Input Configuration

The inputs are configured online. Your device appears in the online dashboard, and for each one there is an “edit details” page that allows you to configure the following messages for the inputs:

Digital Input 1 Low Message

Digital Input 1 High Message

Digital Input 2 Low Message

Digital Input 2 High Message

On start up the Live-Link will send Power-Up Status SMS messages showing the state of each input and output.

3.5 Input Change Event

Whenever an input changes state (and has been duly debounced), a number of things happen:

1. All the users in the phone book are sent a text message showing the new input status.
2. The SMS Controller contacts the Web Server to log the Input Change Event.
3. The Web Server sends emails to the list of email addresses notifying people of the Input Change Event.

3.6 Input Information in Status Messages

Both inputs are reported in the status message.

3.7 Testing the Inputs

During testing take care to exercise the sensors, not the input pins directly. Check that the states of the inputs are showing as expected on the LEDs, and in the status reply messages to the query SMS command.

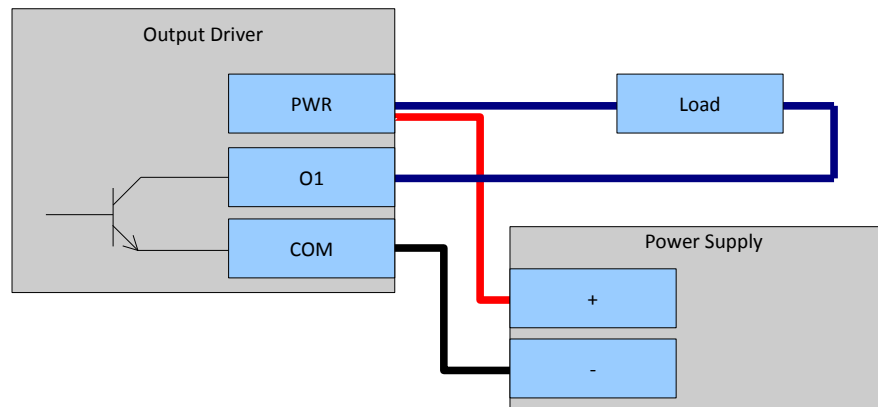
While exercising the inputs, check that the Alarm Notifications are correct.

Check the event logs on the web site.

4 OUTPUTS

4.1 Open-Collector Output Driver

The Live-Link 2x2 SMS Controller features open-collector type outputs that pull the output terminal to COM when activated.



Non-Inductive Load Connection

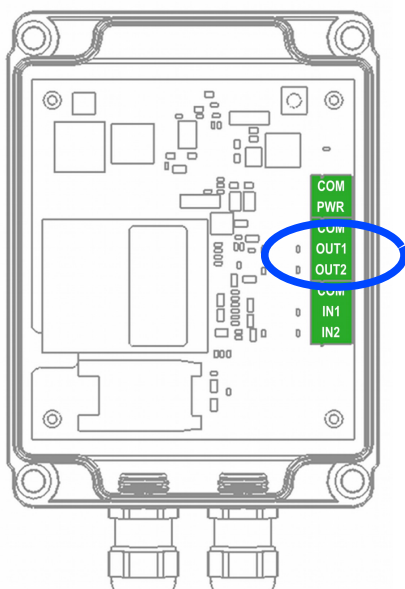
IMPORTANT

Inductive loads must have commutating diodes connected at the load. Failure to properly commutate an inductive load may cause damage to the SMS Controller. This type of damage will not be covered the warranty.

The output transistor is rated at 300mA continuous.

The default or reset state of the outputs is OFF.

4.2 Output Connectors



The output terminals are in the middle of the main terminal block. They are labeled O1 and O2.

4.3 Controlling Outputs with Text Messages

Outputs are controlled by text messages. The following commands can be used:

1 ON
1 OFF
2 ON
2 OFF

Note: These commands are not case sensitive.

When a valid command has been received, the change in output will be sent to all users in the phone book, including the phone number of the user that changed the output.

Security is implemented with Caller ID. Any SMS messages from cell phone numbers that are not in the phone book are ignored. PIN numbers are not used for security. If there is any doubt about the security of a users cell phone, remove that user from the phone book and reconfigure the unit.

If the SMS Controller receives an invalid command from someone in the phone book, they will be sent a text message with a list of valid commands.

Text messages from people who are not in the phone book are logged to the web server and then ignored.

4.4 Output LEDs

The red Output LEDs show the state of each of the outputs:

OFF	Output off.
ON	Output on. Open-collector driver connects the output to COM.

4.5 Output Configuration

The outputs are configured online. Your devices appears in the online dashboard, and for each one there is an “edit details” page that allows you to name the outputs:

Output 1 Name

Output 2 Name

These names are used in the text messages.

4.6 Reset State

IMPORTANT

The outputs are turned OFF whenever the SMS Controller is powered up, or reset.

On reset the Live-Link will send Power-Up Status SMS messages show the state of each input and output. Take care to check the status of the outputs as you will need to manually turn them on if they are not in the state that you want them.

4.7 Output Event Logging

All output change events are logged to the Web Server, including the phone number of the person that changed the output.

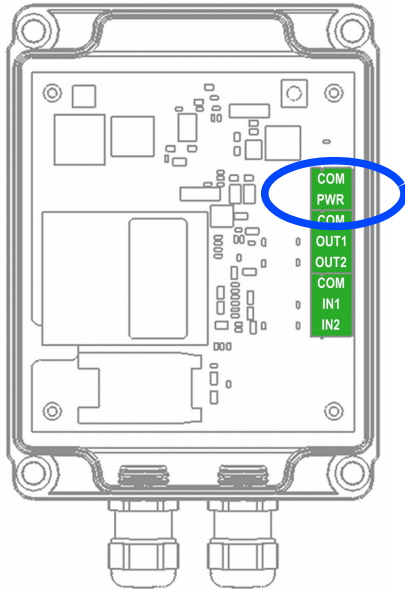
4.8 Output Information in Status Messages

Both outputs are reported in the status message.

5 POWER SUPPLY

The Live-Link SMS Controller will operate from 9-42VDC.

5.1 Power Connectors



The power supply terminals are the upper 2 positions of the main terminal block. They are labeled COM and PWR.

PWR is the positive terminal, COM is negative.

5.2 Power Supply Monitoring

The power supply is monitored. The set-point is predefined at 11.0V. If the supply drops below this level, all the users will receive a text message. A "Return to Normal" message is generated when the voltage rises above 12.0V.

The SMS Controller averages the power supply voltage over a 5 second window. This reduces its susceptibility to noise and spikes. It does mean that by the time an alarm is generated, the voltage will have moved past the set point.

Power supply information is included in the status text messages.

6 CELLULAR CONNECTIVITY

6.1 SIM Card

Your Live-Link SMS Controller will need a SIM Card to access the Cellular Network. To make changes to the SIM Card settings, put it into a mobile phone that operates on the same network, and use its menu system to change settings as required. As the menu systems of each mobile phone are very different, please refer to the mobile phone documentation for more information.

6.1.1 SIM PIN Number

IMPORTANT

Before inserting the SIM Card into the SMS Controller, the SIM Card PIN must be disabled.

SIM Cards are protected with PIN numbers to avoid unauthorised use in case it is lost or stolen. The PIN number protection can be enabled or disabled with the **SIM Card Lock**. This is a setting on the SIM Card that you can change by putting it into a Cellular mobile phone and using its menu system to change settings as required.

New SIM Cards from Vodafone New Zealand usually come with the SIM Card Lock disabled by default, so you may be able to use it straight away.

6.1.2 Cellular Network Access

The SIM Card must be recognised and activated by the Cellular Network of your choice.

Test the SIM Card in a cell phone before fitting it to the SMS Controller.

The type of connection plan that you use must support both SMS messaging and mobile data. If you use a pre-pay plan, ensure that you are in credit.

The Live-Link should be used in an area that has sufficient Cellular Network Coverage.

6.1.3 Fitting the SIM Card

Ensure the the SMS Controller is switched off when fitting the SIM Card into its holder.

6.1.4 Service Center Number

To send SMS messages the SIM card must be setup with the correct Service Center Number for the Cellular Network provider that you use. Your SIM card will probably come with this number preset to the correct number.

The Service Center Number for Vodafone New Zealand, is +6421600600.

If you are using the Live-Link SMS Controller in another country and/or you can not send text messages, check the Service Center Number. To do this, place your SIM Card into a suitable mobile phone and follow the phone's menu system. For more information, contact the Customer Services Department of your Cellular Network provider.

6.2 Cellular Antenna Connector

The SMA type Cellular Antenna Connector is located on the top of the Live-Link SMS Controller. Use an antenna that is suitable for your location.

During commissioning, press the Test Button inside the SMS Controller to generate a text message that shows RSSI and BER.

RSSI (Received Signal Strength Indicator) of 6 or above is usually high enough for reliable operation.

BER (Bit Error Rate) should be less than 5.

RSSI and BER are logged to the Web Server, so you can keep track of network communication levels.



6.3 Cell LED

The green Cell LED shows the state of the cellular network connectivity with a number of flash patterns:



Establishing GPRS Connection (Off, Flashing On)



Online, but IDLE (On, Blinking Off)



Online, and communicating with Web Server (Fast Flash)

6.4 Cell Activity

When the SMS Controller starts up, it attempts to create a GPRS connection. The Cell LED will be off most of the time, and flash on periodically. This usually takes less than 30 seconds.

Once a GPRS connection has been established, the LED will be on, and blink off periodically.

Whenever an event occurs, the SMS Controller will connect to the Advanced Information Networks web server, to register the event, get the latest configuration, and get the current date and time. When it is communicating with the web server the LED will flash quickly.

6.5 What can go Wrong?

This system relies on a number of things, all of which must be working for correct operation:

- An acceptable radio link to the cellular network.
- A valid and operational SIM card with sufficient credit.
- An internet connection to the Advanced Information Networks web Server.

6.5.1 Radio Link

Make sure you can operate your cell phone (assuming it is on the same network), in the same area as the SMS Controller is situated. See Section 6.5.1 above more details.

Be aware that cellular networks can on rare occasions, drop out from time to time. Contact your cellular network provider to see if there are any known issues. If your system is mobile, then there may be times when you are outside the coverage area.

During commissioning you can press the Test button inside the SMS Controller and it will send you RSSI and BER information.

6.5.2 SIM Card

Ensure there is no PIN number on your SIM Card, that it has been activated, and that it has sufficient credit. SIM Cards do fail sometimes. A simple test for all of these scenarios is to test it in your phone.

6.5.3 No GPRS Connection

The SMS Controller can send and receive text messages when is no GPRS connection. If the LED shows that it is trying to get a GPRS connection, send it the query text message: *STATUS*, to see if you get a reply. If you do, you can be sure that you are registered on the cellular network.

Note that the SMS Controller gets its configuration from the Advanced Information Networks web server, so your cell phone will not be in the phone book until it has been successfully configured. This means that you have to get a good configuration before the above text messaging test will work.

If the SMS Controller does not have a GPRS connection for more than 20 minutes, it will reset itself to try remedy the problem.

6.5.4 No Web Server Connection

There are many steps in the internet connection between the SMS Controller and the Advanced Information Networks web server. Any one of these step could have an issue that causes a loss of communication to the server.

The web server itself may be down for maintenance of some kind. We will make every attempt to give prior warning of any known outages.

A simple test it to see if you can access the server from your PC.

Once the SMS Controller has a configuration from the Advanced Information Networks web server, it will save it. This means that text messaging will work after a reset even if there are difficulties with a connection to the web server.

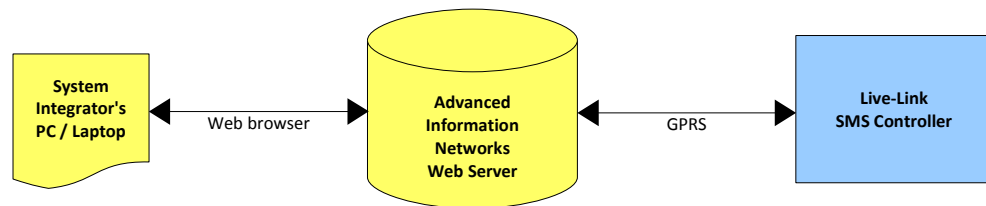
The SMS Controller will queue the last 10 events and log them to the web server as soon as it gets a connection.

7 WEB SERVER

7.1 Configuration

7.1.1 Online Configuration Tools

The Internet is used to remotely configure the SMS Controller. Use a web browser to log into the client area of the Advanced Information Networks web site to configure the system.



SMS Controller Configuration Data-flow Diagram

The Live-Link connects to the Advanced Information Networks web server periodically to send new event data, and to check for a new configuration. If a new configuration is available, it will be downloaded and activated. If not, the periodic connection will be logged at the server as a heartbeat so that the users can see that system is regularly communicating.

Once the system is up and running the need for reconfiguration is infrequent, and usually done remotely. For example the phone book may need to be updated with staff changes.

7.1.2 Adding your SMS Controller to your Online Account

1. Connect your PC to the Internet and go to the following address with your Web Browser:

www.advancedinformation.net/xe7000/

2. Assign your new Live-Link to an existing account:

Login to the Client Area with your existing username and password

Click on the Add Unit page

Setup the new unit. You will need the IMEI number from the SMS Controller

7.1.3 Configuring your SMS Controller Online

Once inside the client area you will see the dashboard which lists all the devices that you have in your account, and some key information about each one.

7.2 Event Logging

Logging of data directly to the Internet provides a new level of Real Time data monitoring for telemetry applications. It is often cheaper to log directly to the Internet than it is to travel to the site to download data from the Internal Memory.

Data is logged directly to the Advanced Information Networks web server.

To log data to the Advanced Information Networks web server you must pay a monthly fee. This data is downloaded from the Client Area of the Advanced Information Networks web site.

7.3 Real Time Clock

The Real Time Clock (RTC) provides date and time information for the system. Data logging scan and log times are based on the RTC. Outgoing alarm and status messages, and logged data are date and time stamped.

Whenever the SMS Controller contacts the server it gets updates its RTC.

7.4 Watchdog

The web server runs a watchdog timer on each device. If it has not heard from a device within a certain timeframe, it will send text messages to the users to let them know that there may be an issue with this site.

7.5 Firmware Upgrades

Firmware upgrades can be done remotely over-the-air.

They are managed by Advanced Information Networks Ltd.

8 TEXT MESSAGING

Users interact with the Live-Link SMS Controller using text messages. The SMS Controller sends Alarm Messages to users when something changes state, and the users can send a can send text message to it to turn an output on or off, or just to query the status of the system.

8.1 Alarm Messages

Alarm Messages can be generated when the state of an input changes between alarm or normal, when an output is changed, or when there is a change in the state of the power supply.

SMS alarm messages are sent to all the users in the phone book.

8.2 Controlling Outputs

See Section 4.3.

8.3 Status Text Messages

To query the status of the system (the equipment being monitored and controlled), send `?` or `STATUS` as an SMS message from your mobile phone to the SMS Controller.

It will reply with a return text message containing details on the inputs, outputs, and power supply.

8.4 Reset Command

The SMS Controller can be remotely reset by sending `RESET` as a text message. When this is received, all users are notified that the system will be reset (and who sent the command), and then 30 seconds later the system will restart. Note that outputs that were on will be switched off.

8.5 Unknown Commands

If the SMS Controller receives an unrecognised text message command from a user who is in the phone book, it replies showing a list of valid commands.

8.6 Text Messages from Unauthorised Users

Test messages received from users who are not in the phone book are logged to the web server, and then ignored.

9 TROUBLE SHOOTING AND FAQs

No reply to Status Query

When I query the status of the SMS Controller by sending it a text message with ? or STATUS, I do not get a reply.

Is the power turned on? Is there someone on site that can verify this for you?

Make sure the SIM card is active and in credit if on a prepay account.

Ensure that you are sending the device query to the correct phone number.

Check that you are sending the correct command to the SMS Controller: ? or STATUS

Does the Cellular Modem has sufficient signal strength? Check the antenna and the Antenna Cable. Are there any Cellular Network problems?

The number of the mobile phone you are using must be in the Phonebook of the SMS Controller.

Alarm message are taking a long time.

The Cellular Network can take some time to pass an SMS message from one mobile to another. Contact your Cellular Network provider if you experience consistently long delays.

Does the Cellular Modem has sufficient signal strength? Check the antenna and the Antenna Cable. Are there any Cellular Network problems?

Do I need to acknowledge alarms?

No. Alarm messages are sent only once when the event occurs.

The SMS Controller is not going on-line.

The SMS Controller must be able to access the internet so that it can download its configuration from the Advanced Information Networks web server.

10 WARRANTY

This product is guaranteed by Advanced Information Networks Limited to be free of manufacturing defects or faulty materials, for a period of twelve months from the date of invoice.

This warranty covers the repair or replacement of goods returned to Advanced Information Networks Limited. Expenses incurred in returning the Live-Link SMS Controller are not included.

Exclusions:

Damage that has been caused to the outputs by inductive loads.

Water damage. While the case is rated for outdoor use, the sealing of case and cables in their glands is responsibility of the user.

Normal wear and tear.

Goods may be repaired or replaced at Advanced Information Networks Limited's discretion. Repairs by parties other than Advanced Information Networks Limited during the warranty period will not be reimbursed and will end the warranty agreement.

This warranty extends to the repair of the Live-Link SMS Controller only and does not cover consequential damage or damage to itself or faulty operation due to poor installation, incorrect programming, use of incompatible peripherals, mechanical or electrical abuse, sustained shipping damage, use in unsuitable mechanical or electrical environments, or Acts of God.

Please contact Advanced Information Networks Customer Service to obtain a Returned Materials Authorisation (RMA) prior to shipping any products for repair. All shipments must be shipped prepaid and include proof of the date of your original purchase. Please include your name, address, phone number, email address and a brief description of the problem.

11 TERMS AND CONDITIONS

By using Advanced Information Networks Limited's products you agree to be bound to the following terms and conditions:

1. Advanced Information Networks Limited makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice.
2. All title and copyrights in and to Advanced Information Networks Limited's products (including but not limited to any images, photographs, text, web pages, web applications, software, firmware, circuit design, mechanical design) and the accompanying printed materials, and any copies of software products, are owned by Advanced Information Networks Limited or its suppliers.
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12 DOCUMENT HISTORY

Revision	Date	Author	Notes
Preliminary 1	01/08/11	GPJ	Preliminary release for review. All details subject to change.